amino

Amino Technical Note 005

Debug Cable – Quick Reference

February 2011

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February 2011

Issue 109

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Document history

Version	Date issued	Changes
109	11/02/11	Added picture of flexicable.
108	14/01/11	Additional information added for modifying and locating the debug header, in particular when a case is fitted.
107	23/12/10	A129 and H140 pictures added.
106	5/10/10	A130Hv2 picture amended as debug position incorrectly shown.
105	13/09/10	Mood information added. Document changed to new Company format.

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Debug Cable – Quick Reference

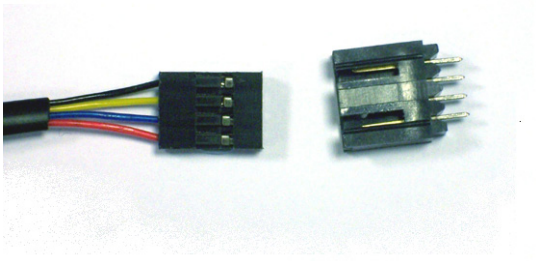
This document decribes how to set up and use the Amino debug cable on the AmiNET and Mood set-top boxes (STBs). The debug cable is essential when testing an STB to aid in the rapid diagnosis of faults and unexpected behaviour. It is applicable to the following versions of STB:

AmiNET	**Mood**
A103	Mood 400-002
A110	Mood 400-020
A110H	Mood 400-022
A125	Mood 400-030
A129	
A130EU/US	Mood 400-032
A130H	M540
A130EU/USv2	
A130Hv2	
A130	
A140	
H140	
A500	
A530EU/US	
A540	

1 The Debug Cable

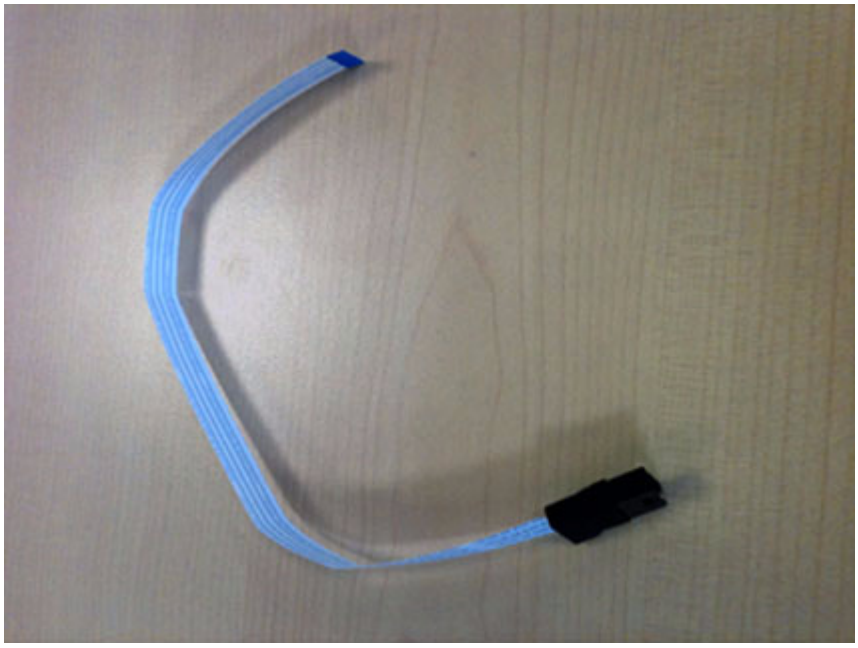
1.1 Aminet x3x and Mood400-002/020/022 STBs

The Amino debug cable (part number 500-745) has a black connector, a light grey plastic breakout box and a DB9 serial connector. It is also supplied with a debug header - a black connector with 4 pins.



1.2 Aminet x4x and Mood400 030/032 STBs

The Amino flexi-cable assembly (part number 512-857-00-00-CABL-BP) has a black header and a 4-way flexible cable attached. The flexible cable will normally be white or light blue but may vary depending on the supplier.



2 AmiNET STBs

2.1 Connecting the debug header to Aminet x3x STBs

Fitting a debug header to an AmiNET x3x STB is a fairly simple process. Before you start you will need:

- A Philips head screwdriver.
- A debug header.
- (Optional) A soldering iron and some solder.

Firstly remove the screws on the rear of the unit (and on the A500, disconnect the two cables) and then slide the PCB backwards out of the case.
The debug header fits into 4 holes on the circuit board. On each version of STB the location of the header holes is different - see Locating the debug header positions - Aminet x3x STBs for the locations. On every STB except the A530 (see the note below), the silk screen will be as shown in Figure 1.
The two features to note are:

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- there are two white marks along one side of the silk screening
- the end pin is surrounded by a square solder pad.

These features are both highlighted in red in Figure 1 and are a useful indication of the correct header orientation.

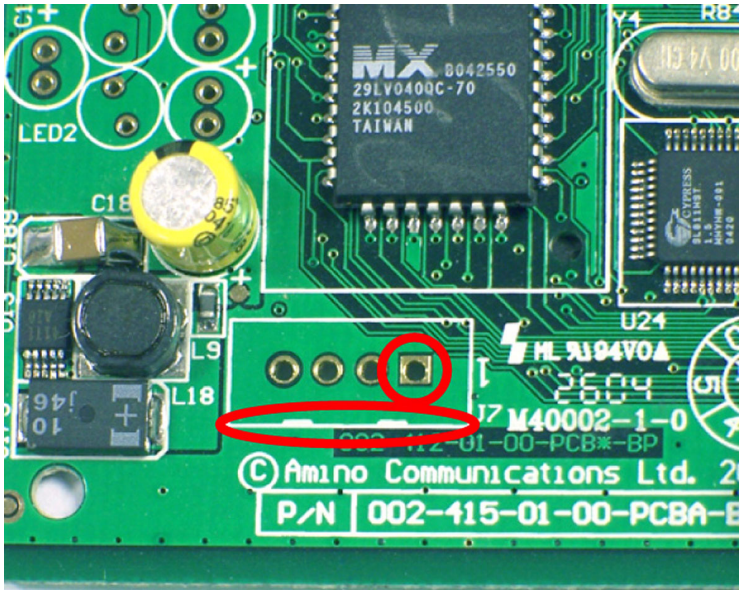

Figure 1: Example header location

The debug header has two slots on one edge. These slots align with the two white marks highlighted on the pcb silkscreen. In addition, the square pad indicates the position for the **red** wire of the debug cable. Insert the header pins into the holes on the pcb.

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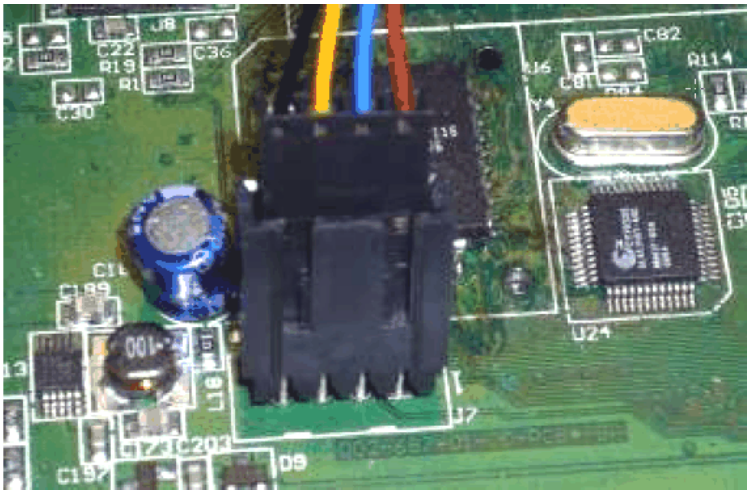


Figure 2: Debug cable in place

NOTE

If the header and cable are placed the wrong way round the box will not boot up, no LEDs will light, and there will be no debug output. Removing the debug cable and inserting it correctly will return the box to normal operation.

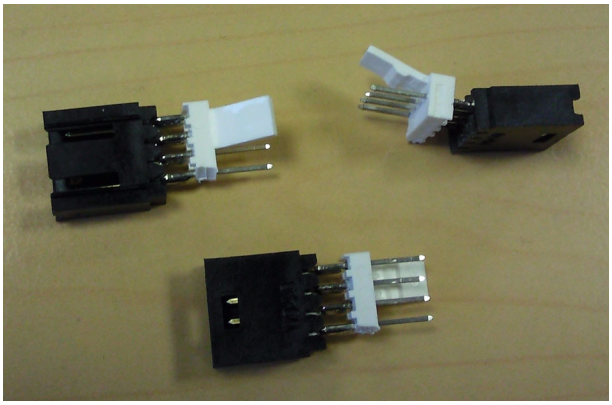
Remember to remove the debug cable from the set-top box **before** disconnecting the other end of the debug cable from the PC.

It is not strictly necessary to solder the debug header in place if it is inconvenient for you to do so. However, the header pins are not a tight fit in the holes in the pcb so if you do not solder the header in place, you may have to apply a slight pressure on the header to ensure good electrical connectivity.

2.1.1 Modifying and routing the debug header

Extending the header pins

The debug header can be modified using 'Molex'* headers (or equivalent). Attaching these headers as shown in Figure 3 gives longer pins for insertion, and the plastic frame can be used to provide some compression force to hold the header in place if it is not soldered.



*Molex 0.1" 4 way header, square pin, part number: 22-27-2041. Available from http://uk.farnell.com/

Attaching a ribbon cable

In some circumstances (for example, a test laboratory) you may need to use the debug facility with the STB case fitted. It is possible to solder a ribbon cable onto the pcb where the debug header would normally be fitted, and then route this cable outside the case.

If you solder a ribbon cable between the debug header and the pcb, ensure you connect the cable 'pin to pin'. For example, use the red wire between the header pin and the square solder pad which it would normally be fitted into, then connect the remaining cables in the correct order.

Routing the ribbon cable (x3x STBs)

To route the cable out of the STB and allow you to refit the cover, we suggest you feed the ribbon cable through one of the holes in the back plate that are used when the STB is mounted vertically.

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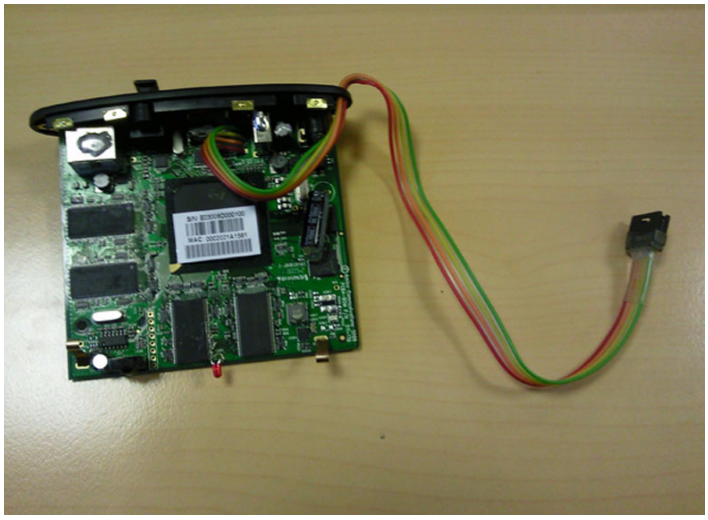
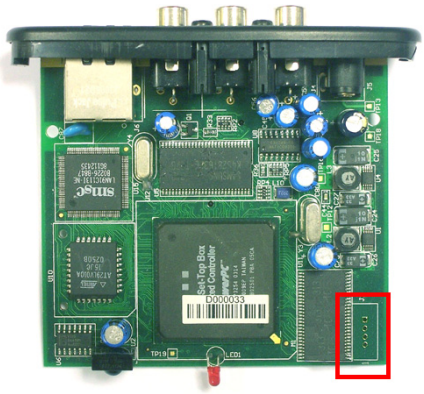


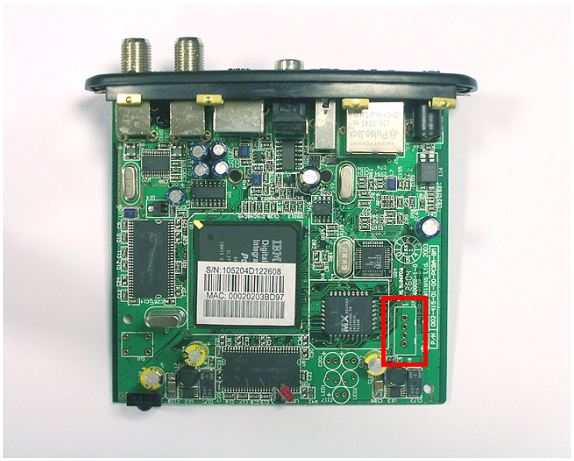
2.2 Locating the debug header positions - Aminet x3x STBs

The pictures below highlight where to find the debug connector on the different versions:

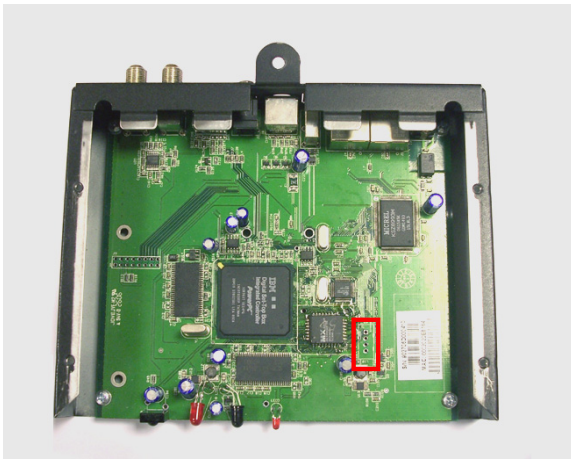
AmiNET103



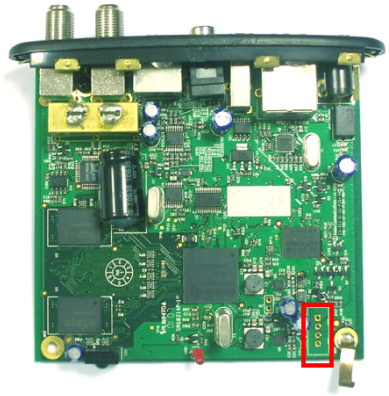
AmiNET110



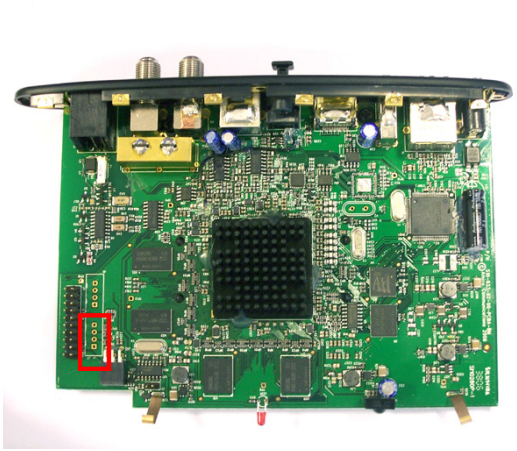
AmiNET110H



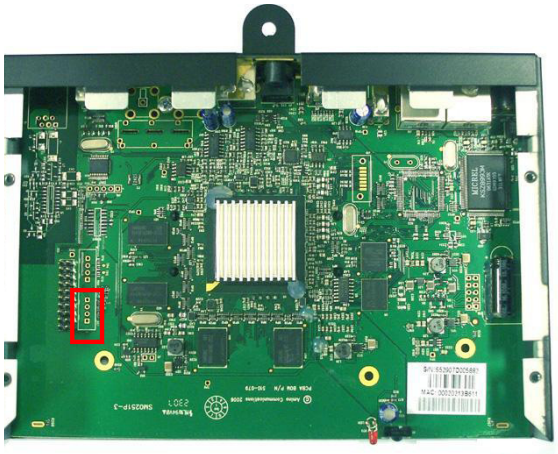
AmiNET125



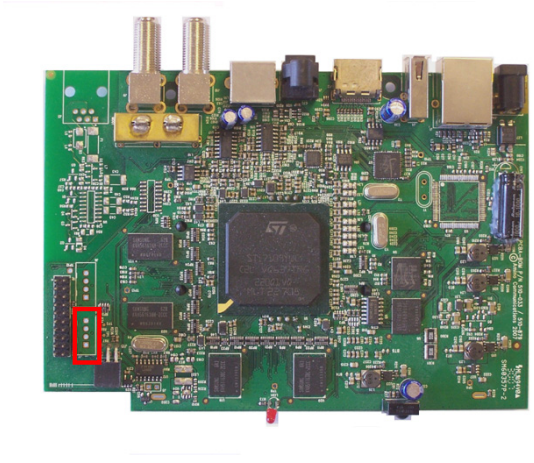
AmiNET130EU/US



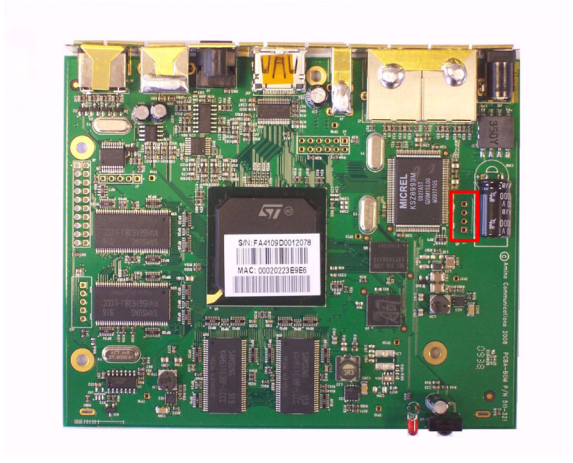
AmiNET130H



AmiNET130EU/USv2



AmiNET130Hv2



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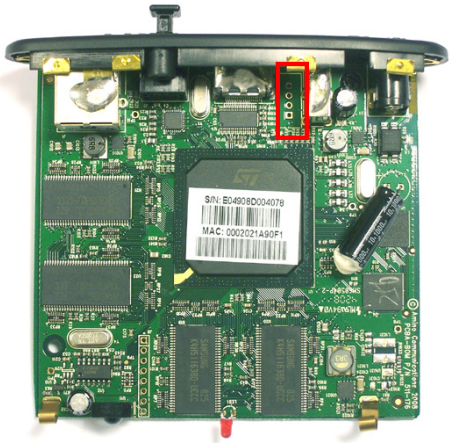
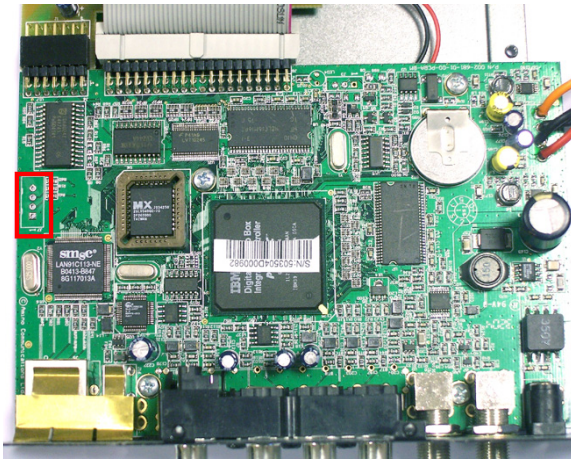
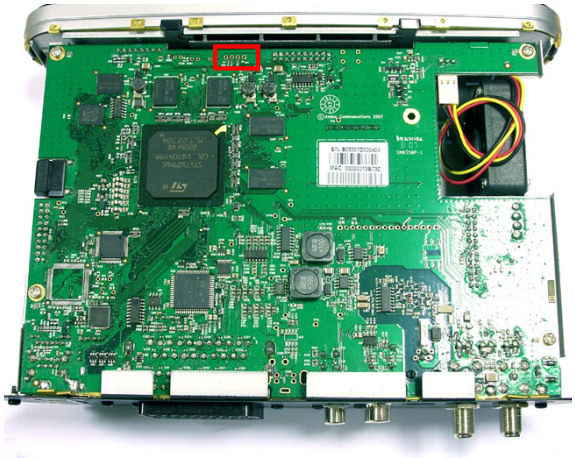
AmiNET130M



AmiNET500



AmiNET530EU/US (see note below)



NOTE On the A530EU/US it is easier to connect the debug cable to the 'underside' of the PCB. When the casing is removed this is the side of the PCB that is exposed but is not the side showing the silk screen. However, the end pin of the debug header position is still marked with a square solder pad.

2.3 Connecting the debug cable to Aminet x4x STBs

On the x4x series STBs you can use the standard flexi-cable adaptor provided by Amino to extend the cable. This can be threaded through the back plate alongside the RJ45 connector so that the STB can be used with the case fitted but still with debug facilities available.

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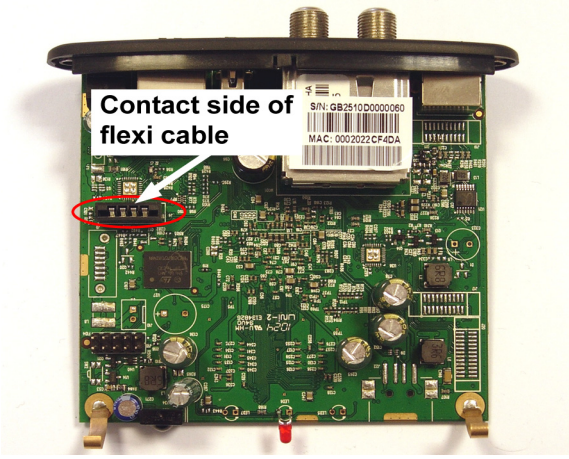
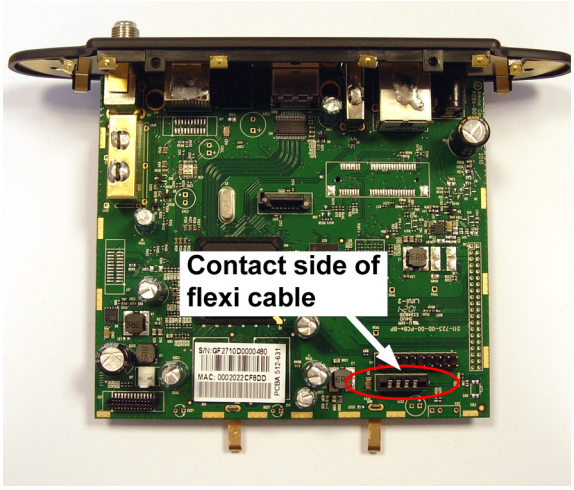
2.4 Locating the debug header positions - Aminet x4x STBs

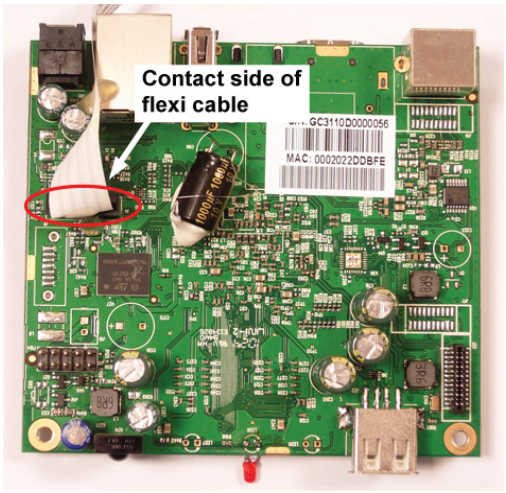
AmiNET A140 and A129



AmiNET A540



AmiNET H140



3 Mood STBs

3.1 Connecting the debug cable to Mood STBs

Fitting a debug cable to a Mood STB is a simple process. Before you start you will need:

- A Philips head screwdriver or a T-10 torx head screwdriver depending on the model
- A debug header.

Remove the cover retaining screws on the unit and slide the cover backwards and off the STB.
The header position is in a different place on each of the 002, 020 and 022 STBs.

The header type on the 030 and 032 STBs is the flexi-cable type as on the AmiNET x4x series STBs .

3.2 Locating the debug header positions - Mood STBs

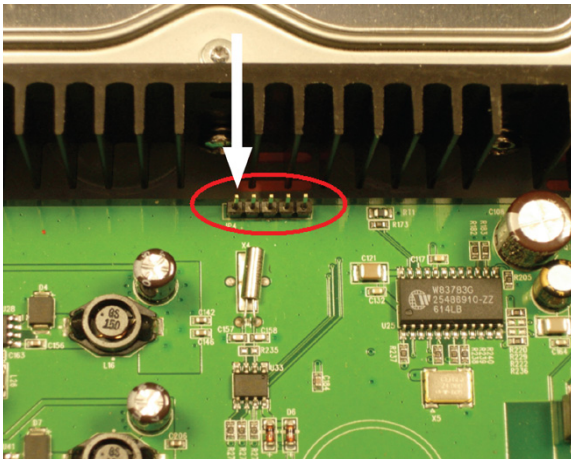
The pictures below highlight where to find the debug connector on each version.

NOTE

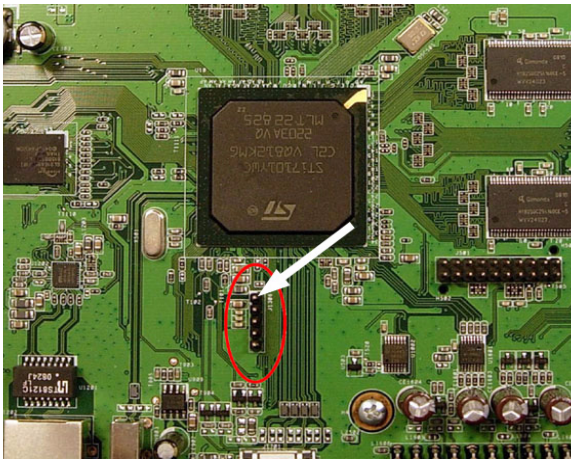
The header fitted to the Mood STBs 002, 020, 022 is not polarised, so it is possible to fit the debug cable the wrong way round. For these versions, in each picture the arrow indicates the position of the red wire in the debug cable.

Remember to remove the debug cable from the set-top box before disconnecting the other end of the debug cable from the PC.

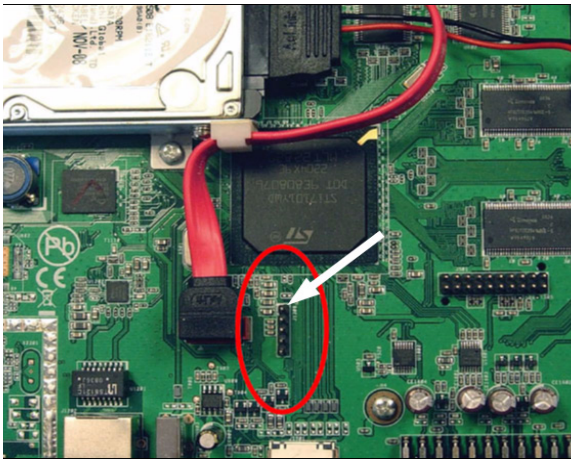
Mood 400-002



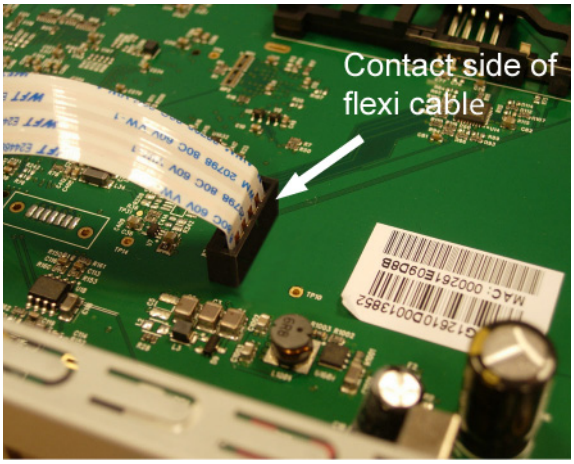
Mood 400-020



Mood 400-022



Mood 400-030



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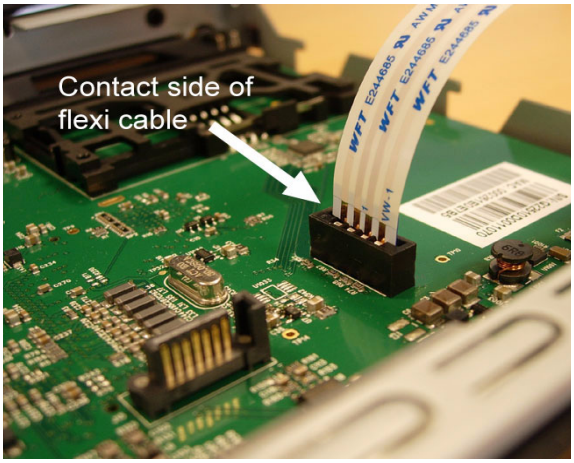
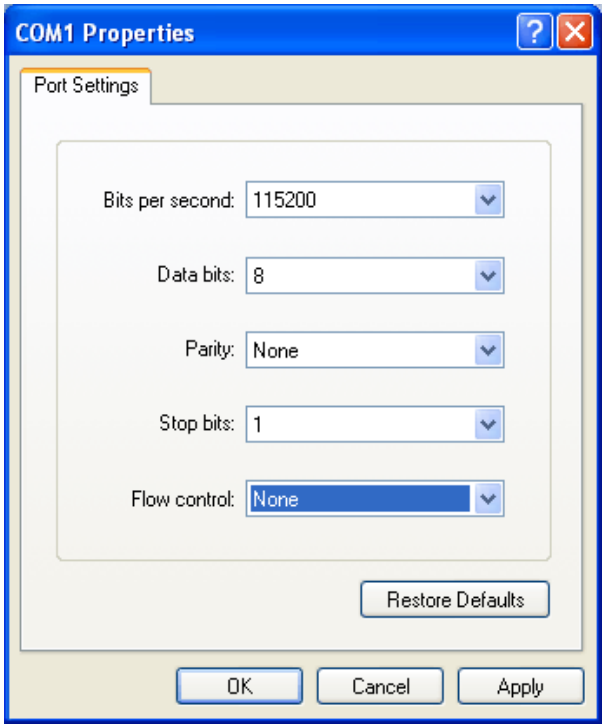
Mood 400-032



(Serial ATA cable removed for clarity)

4 Using the Debug Cable

To use the Amino debug cable connect the DB9 plug to the serial port on your PC.
Open your terminal software, for example, Minicom or Hyperterminal and connect at 115200 bps, 8 bits,1 stop bit, NO parity and NO flow control.Your terminal window should now show the debug output from your STB and allow you to log in to the console.



The standard Amino username and password are `root` and `root2root`.

5 Useful Commands

This section details some useful commands that can be run using the debug cable in either IntActOS or Linux. IntActOS is a simple Operating System that is started when the STB is booted. It enables the programming of code images and launches Linux, the STBs main operating system.
The debug cable can also be used to view the debug messages which appear on the console as part of the normal operation of the STB. For example, you will be able to immediately see the status of all stages of a software upgrade, see the status of the video engine when playing a clip, and track down problems with PID detection, among other things.

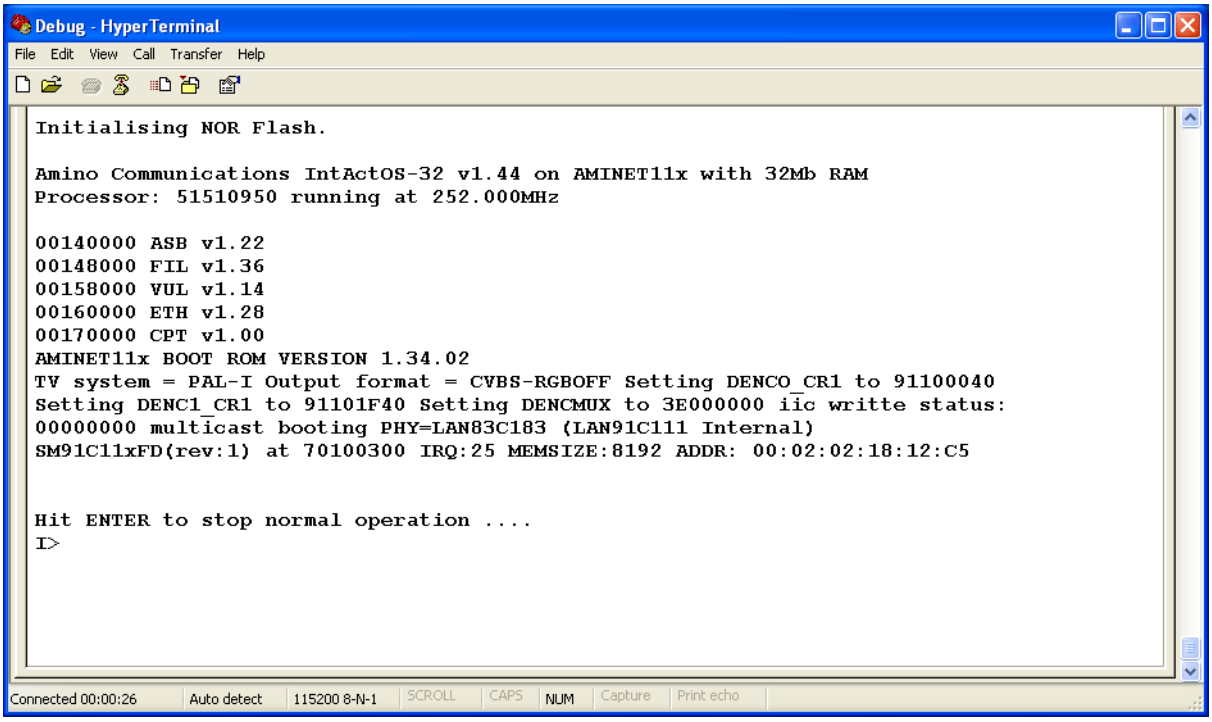
5.1 IntActOS

To enter IntActOS

1. Connect the debug cable and power on the STB
2. At the "Hit ENTER to stop normal operation ..." prompt, press Enter to enter IntActOS.

   The prompt `I>` will appear as shown below.

   The following list of useful commands are not case sensitive.


Debug - HyperTerminal
File Edit View Call Transfer Help
Initialising NOR Flash.
Amino Communications IntActOS-32 v1.44 on AMINET11x with 32Mb RAM
Processor: 51510950 running at 252.000MHz
00140000 ASB v1.22
00148000 FIL v1.36
00158000 VUL v1.14
00160000 ETH v1.28
00170000 CPT v1.00
AMINET11x BOOT ROM VERSION 1.34.02
TV system = PAL-I Output format = CVBS-RGBOFF Setting DENCO_CR1 to 91100040
Setting DENC1_CR1 to 91101F40 Setting DENCMUX to 3E000000 iic writte status:
00000000 multicast booting PHY=LAN83C183 (LAN91C111 Internal)
SM91C11xFD(rev:1) at 70100300 IRQ:25 MEMSIZE:8192 ADDR: 00:02:02:18:12:C5
Hit ENTER to stop normal operation ....
I>
Connected 00:00:26
Auto detect
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

5.1.1 Show All

The `show all` command shows the values stored in the NOR flash.
For example:

```
I>show all
Locked : 00
BoxID : 701306D000085
BoardRev : 2
VideoMode : 1
OutFormat : 2
```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```
RFChan : 167
RFMode : 0
RFFreqTbl : 0
CAID : F0F0F0F0
NDSSoftwareVersion : 00000000
NDSDriverVersion : 00
ManufacturerID : 1D
STBModelType : 01
HardwareVersion : 01
MACaddress : 00:02:02:0C:91:E0
Ethernet : 0
UseDHCP : Y
IPaddress : 0.0.0.0
Gateway : 0.0.0.0
Netmask : 0.0.0.0
TimeServer : 0.0.0.0
DNS : 0.0.0.0
McastAdr : 0.0.0.0
McastPort : 0
I>
```

5.1.2 Format

The `format` command is used to completely erase the NAND flash and therefore any software loaded onto the box. This will put the box into a multicast aware state, ready to receive a new software image from a multicast (middleware) server.

5.1.3 Reset

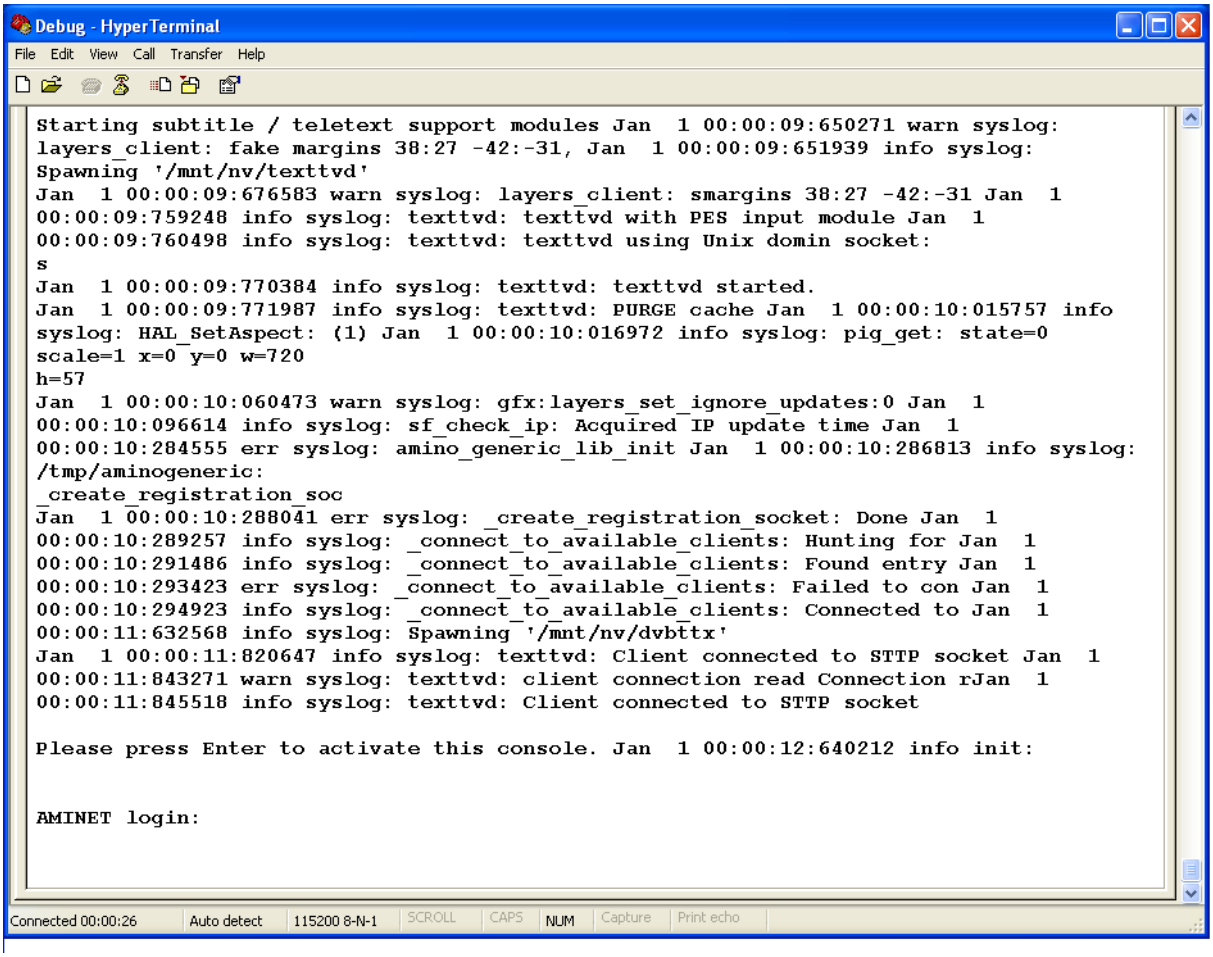
The `reset` command is used to exit from IntActOS.

5.1.4 Help

Shows all the available commands.

5.2 Linux

This section has a brief list of useful commands that will help you gather information about the STB. Most of these are standard Linux commands.
Once the box has booted up fully into Linux, the console will show the message “Please press Enter to activate this console.” Pressing **Enter** prompts you for the username and password (`root` and `root2root`)


Debug - HyperTerminal
File Edit View Call Transfer Help
Starting subtitle / teletext support modules Jan 1 00:00:09:650271 warn syslog:
layers_client: fake margins 38:27 -42:-31, Jan 1 00:00:09:651939 info syslog:
Spawning '/mnt/nv/texttvd'
Jan 1 00:00:09:676583 warn syslog: layers_client: smargins 38:27 -42:-31 Jan 1
00:00:09:759248 info syslog: texttvd: texttvd with PES input module Jan 1
00:00:09:760498 info syslog: texttvd: texttvd using Unix domin socket:
s
Jan 1 00:00:09:770384 info syslog: texttvd: texttvd started.
Jan 1 00:00:09:771987 info syslog: texttvd: PURGE cache Jan 1 00:00:10:015757 info
syslog: HAL_SetAspect: (1) Jan 1 00:00:10:016972 info syslog: pig_get: state=0
scale=1 x=0 y=0 w=720
h=57
Jan 1 00:00:10:060473 warn syslog: gfx:layers_set_ignore_updates:0 Jan 1
00:00:10:096614 info syslog: sf_check_ip: Acquired IP update time Jan 1
00:00:10:284555 err syslog: amino_generic_lib_init Jan 1 00:00:10:286813 info syslog:
/tmp/aminogeneric:
_create_registration_soc
Jan 1 00:00:10:288041 err syslog: _create_registration_socket: Done Jan 1
00:00:10:289257 info syslog: _connect_to_available_clients: Hunting for Jan 1
00:00:10:291486 info syslog: _connect_to_available_clients: Found entry Jan 1
00:00:10:293423 err syslog: _connect_to_available_clients: Failed to con Jan 1
00:00:10:294923 info syslog: _connect_to_available_clients: Connected to Jan 1
00:00:11:632568 info syslog: Spawning '/mnt/nv/dvbttx'
Jan 1 00:00:11:820647 info syslog: texttvd: Client connected to STTP socket Jan 1
00:00:11:843271 warn syslog: texttvd: client connection read Connection rJan 1
00:00:11:845518 info syslog: texttvd: Client connected to STTP socket
Please press Enter to activate this console. Jan 1 00:00:12:640212 info init:
AMINET login:
Connected 00:00:26
Auto detect
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

5.2.1 Ifconfig

The ifconfig command tells you the status of the interfaces on the box, it will tell you the IP address and subnet mask of the interface and statistics on transmitted and received packets.

5.2.2 Route

This command shows the routing table. The most useful information here is generally the default gateway.

5.2.3 Cat /proc/sys/dev/eth0/lnkfail

Running the command cat /proc/sys/dev/eth0/lnkfail will return a 1 if the Ethernet link is down, and 0 if it is up. Other files in this directory are also useful, for example aspeed returns the speed of the interface while afduplx will return 1 for full duplex and 0 for half duplex.

5.2.4 Vi /mnt/nv/config.txt

This command opens the browser configuration file in the editor vi. Other files in /mnt/nv that you may wish to edit include settings and netconf. Vi is a standard Linux editor and more information on its usage is available on the Internet.

5.2.5 Free

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The free command returns the status of the memory in the box.

5.2.6 Reboot

A user invoked reset of the set-top box.

6 Quick Guide to Reflashing an STB

It is possible to reflash a box by clearing the memory. This will put it into a multicast aware state, readyto receive a new software image from a multicast (middleware) server.
The easiest way to do this is:

1. Connect the debug cable and power on the STB.
2. At the “Hit ENTER to stop normal operation ...” prompt press Enter to enter IntActOS.
3. The prompt I> will appear as shown above.
4. At the prompt type f (for format) and press Enter.
5. It will ask for confirmation – press Y.
6. Once the format is completed type reset and press Enter to reset the box.

It will now boot up with the Loading… message on the screen and will attempt to load a new image from a multicast server.

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